



ESPERANCE PORTS
Sea & Land

PM₁₀ EXCEEDANCE REPORT

MONITORING PERIOD

MIDDAY TO MIDDAY

5TH – 6TH DECEMBER 2011

Revision	Prepared	Reviewed	Approved	Date	Description
1	C Field	A Leonard		16/12/2011	

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1. PURPOSE

On the 7th December 2011, the Esperance Ports Sea and Land (EPSL) became aware of PM₁₀ concentrations in excess of ambient concentration targets. Consistent with the latest Licence (L5099/1974/13) issued on the 24th February 2011 (amended 28th July 2011) requirement of Condition 9, this requires an exceedance report be submitted to the DEC, within seven working days (by 16th December 2011). The targets are replicated in Table 1 below. Two exceedances were recorded for the monitoring period of 1200hrs 5th December 2011 to 1200hrs on 6th December 2011.

Table 1. Emission Concentration Targets from Licence Number L5099/1974/13 issued to EPSL on 24 February 2011 (amended 28th July 2011).

Emission	Ambient concentration target
Nickel in air	0.14 µg/m ³
Dust as PM ₁₀	50 µg/m ³
Dust as TSP	90 µg/m ³
Silica in air	5 µg/m ³

2. INVESTIGATION

2.1 Exceedance Information

The recorded PM₁₀ concentrations were marginally above the emission concentration target (Table 1) according to the Licence L5099/1974/13 for the monitoring period of 1200 hours 5th December 2011 to 1200 hours 6th December 2011 was as follows:

- Site 2: 53.9 µg/m³; and
- Site 4: 51.3 µg/m³

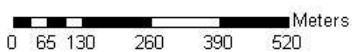


Disclaimer: This map consists of shape files generated by EPSL (2011) and Landgate (2010). This map is not to be used for navigational purposes. Positional accuracy should be considered as approximate.



Title: Location of HVAS/TEOM monitoring sites 1 to 4, HVAS community monitoring site 5, E-Sampler 5 to 8 (EP5-EP8) and EP7 - Meterological station

Scale: 1:10,000



Date: 5 January 2011

Map no.

Figure 1: Location of Air Quality Monitoring Stations

2.2 Port Activities

The following shipping activities were occurring at the Port during the exceedance period:

- Marine Vessel (MV) Ocean Phoenix was alongside Berth 1 between 0130 4th December and 1900 5th December, and was being loaded with wheat;
- Marine Vessel (MV) Pearler was alongside Berth 2 between 1430 5th December and 1230 6th December and was being loaded with nickel sulphide in containers; and
- Marine Vessel (MV) Medi Venezia was alongside Berth 3 between 2026 4th December and 1230 6th December and was being loaded with iron ore.

Other activities include:

- 27865 tonnes of iron ore averaged across 3 trains;
- 168 tonnes of nickel sulphide, averaged across 2 trucks; and
- 776 tonnes of formed sulphur was out-loaded across 10 trucks.

2.3 Meteorology

The wind directions for the 24 hour period, between 1200 5th December and 1200 6th December, were winds from the ENE (5%), E (21%), ESE (57%) and SE (7%) (Figure 2). The maximum hourly average wind speed of 11.5 m/s (41.5 km/hr) was recorded from the ESE at 1000 on 6th December. The 'Beaufort Wind Force Scale' is a measure of understanding wind speeds in descriptive terminology. A wind speed of 11.5 m/s is described as 'strong winds' (BOM, 2011).

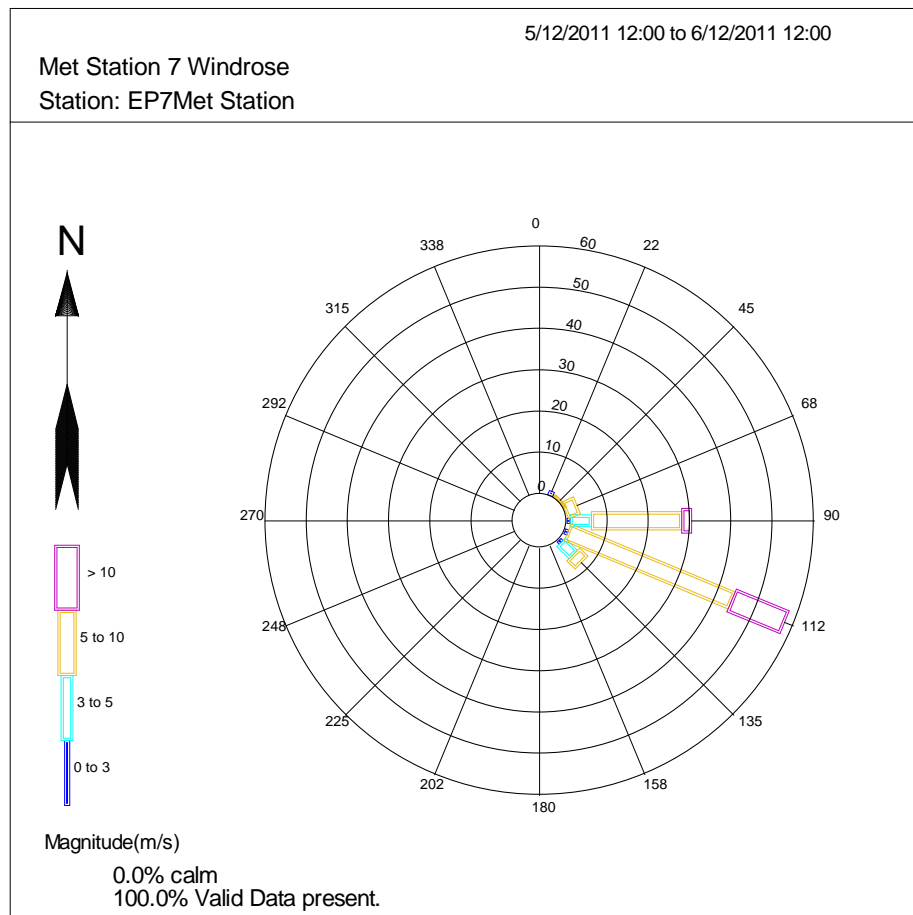


Figure 2: Windrose for the Exceedance Period 1200 on 5/12/2011 to 1200 on 6/12/2011

2.4 PM₁₀ Dust Levels

The predominant East and ESE winds places both Sites 2 and 4 downwind of the CBH terminal area, the reclaim area containing iron ore sheds 3 and 4 and Dempster Head.

The 24 hour PM₁₀ exceedance at Site 4 was due to the peak PM₁₀ dust levels between 1200 to 2100 hours on 5th December 2011 and from a second peak between 0800 and 1200 on 6th December 2011 (**Figure 3**). Site 4 is located about 190m from the Port boundary and close to the terminal operations of CBH. The peaks in dust levels during these times coincide with the inloading of grain off trucks during the peak harvest period. The second peak at Site 4 on the 6th of December coincided with wind speeds over 10 m/s for the duration of that period, grain inloaded from trucks at CBH and unloading of one iron ore train, but no grain ship loading was occurring at that time

The peak PM₁₀ levels at Site 2 occurred between about 1300 and 1900 hours on 5th December 2011. Wheat loading was occurring at Berth 1 during these times and ceased at 1822 hours with a peak at 1500 hours. The predominant E to ESE winds would have blown dust directly towards the Site 2 monitoring station at the end of the shiploading period.

Dust generated from shiploading at Berth 2 and Berth 3 was unlikely. MV Pearler (Berth 2) was being loaded with sealed sea containers containing nickel sulphide. MV Medi Venizia (Berth 3) was being loaded with iron ore but the east to east south easterly winds would have blown any dust generated from the operations into harbour waters away from site 4, but some dust potentially contributing to the site 2 measurement. When the iron levels in TSP are known for this site it will provide a better indication on the contribution of iron ore dust given the majority of this dust is TSP and >10 µm diameter.

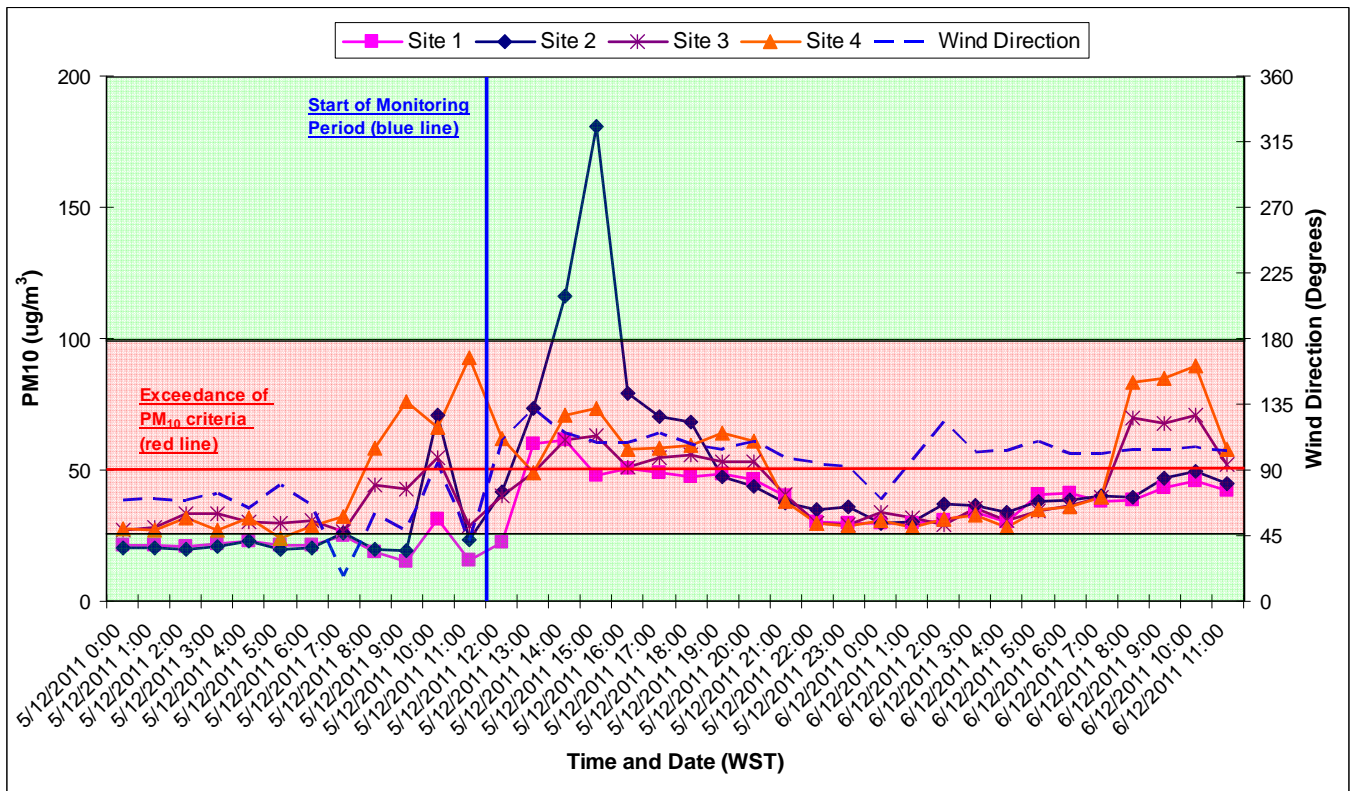


Figure 3: Hourly PM₁₀ results for the monitoring period 0000 hrs 5/12/2011 to 1200 hrs 6/11/2011

Note: Raw data source is from TEOM monitoring stations 1, 2, 3 and 4.

2.5 TSP Dust Levels and Metals

As would be expected if the dust was mainly sand and grain dust, composed of mainly particulates $>10\ \mu\text{m}$, the TSP (total suspended particles) readings for both Site 2 and Site 4 were also elevated, exceeding the $90\ \mu\text{g}/\text{m}^3$ TSP criteria between the 5/12/2011 and 6/12/2011. The iron and nickel levels in these TSP were relatively low as a percentage of TSP. Iron levels were 1.11% and 0.93% at site 2 and site 4, respectively. Nickel levels were even less at 0.008% and 0.004% for sites 2 and 4.

Another exceedance report will be submitted within seven working days for these TSP exceedances of 180 and $140\ \mu\text{g}/\text{m}^3$ at sites 2 and site 4. Exceedances were also recorded at Site 1 and Site 3 on the same day as well and the community site (Site 5) was close to an exceedance at $87\ \mu\text{g}/\text{m}^3$. These results suggest that the exceedances likely to be due to strong wind conditions.

3. CONCLUSIONS

PM₁₀ and TSP are a poor indicator of emissions from prescribed activities in the port.

The PM₁₀ exceedances at Site 2 and Site 4 both between 1200 on 5th December 2011 to 1200 on 6th December 2011 are most likely due to a combination of grain ship loading and dust being generated from CBH terminal operations and unsealed surfaces within the Port and on Dempster Head. The strong E to ESE winds on that day are part of the main reason for the exceedance.

The PM₁₀ exceedances coincide with TSP exceedances at the same sites, on the same day. The levels of both iron and nickel in TSP were however, relatively low, suggesting no link with shiploading of nickel or iron ore.

3.1 Corrective Action

EPSL already implements a dust binding agent on unsealed surfaces. No further action can be practically taken by EPSL to further reduce dust. EPSL has been expecting CBH to increase its dust controls.